

## The participatory process to a low carbon economy in the German state of North Rhine-Westphalia



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October 2014

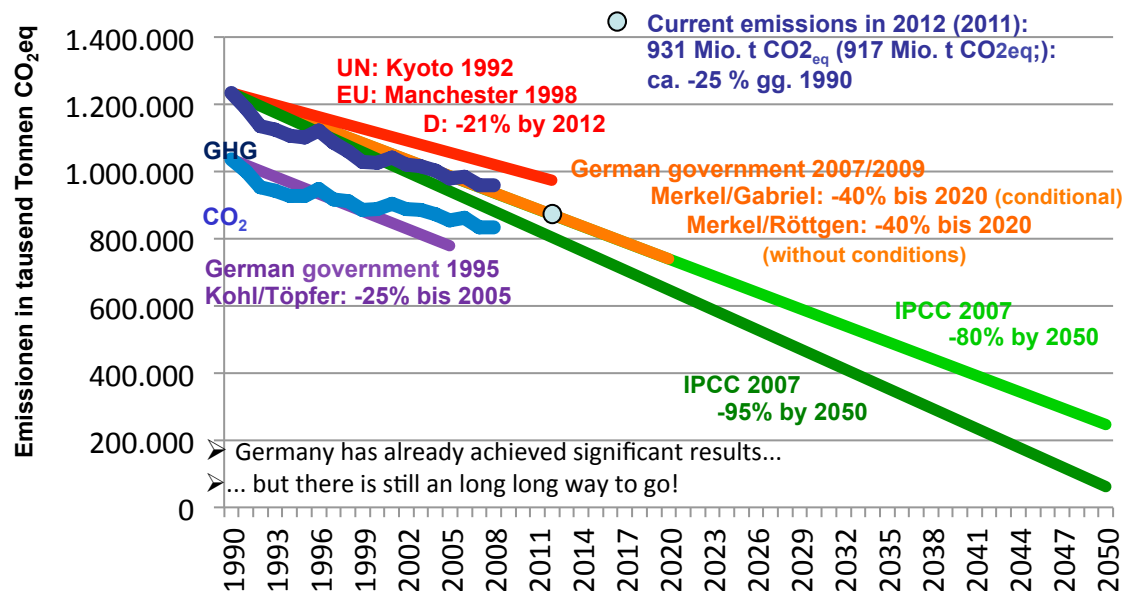
# Background for the state level process - central targets and milestones of the German „Energiewende“

# German energy concept (adapted status of July 2011)

Concept combines climate protection target with nuclear phase out strategy and sets further ambitious RE deployment goals



- Renewable energies and energy efficiency are central pillars of the “Energiewende” in Germany
- Primary energy consumption is to be reduced by more than 50% by 2050.
- Market share of renewable energies is to be fostered, concept aims for 2050 for
  - more than 60% in terms of primary energy consumption
  - more than 80% regarding electricity generation



## Nuclear phase out program



# Development of GHG emissions in Germany

Germany is loosing track to achieve 2020 reduction goal if current increase of GHG emissions continues

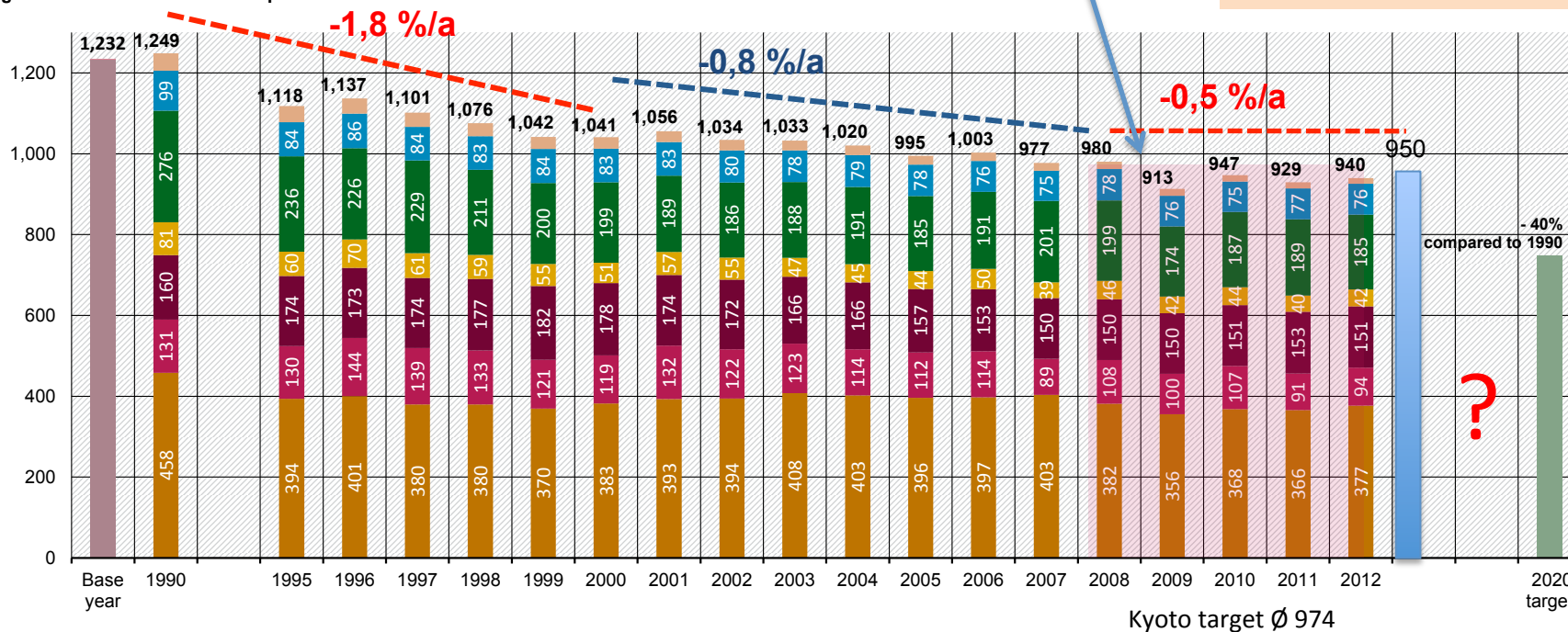
2012: Energy supply sector as main driver due to low CO<sub>2</sub>-price

2013: again +1.2 % emissions increase (cold winter as one driver)

2009: financial crisis

Development of greenhouse gas emissions in Germany per sector

Figures in million tonnes CO<sub>2</sub> equivalents



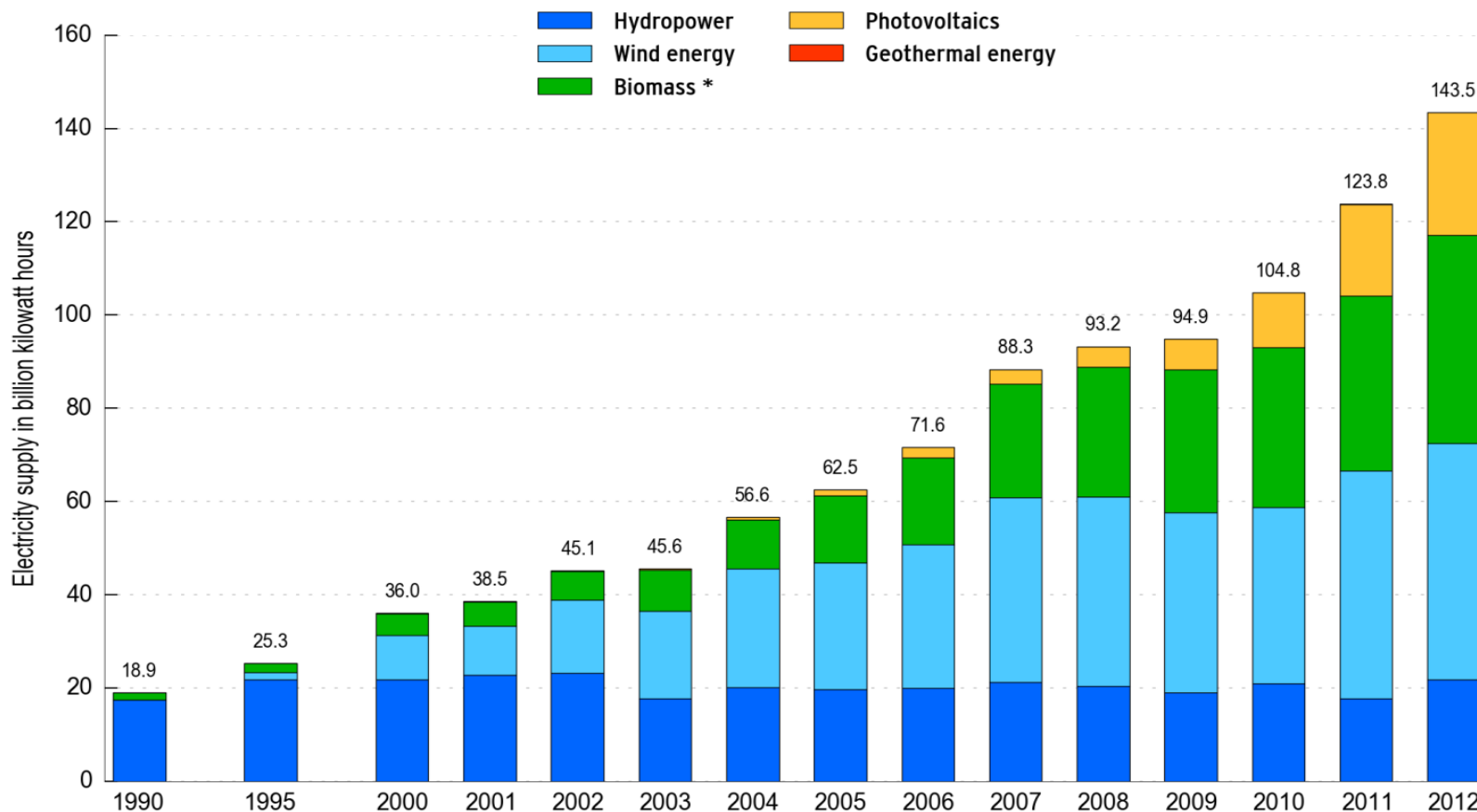
Legend: Energy industry, Households, Transport, Commerce, trade, services, Industry, Agriculture, Other emissions, Base year emissions as set out in Kyoto Protocol, -40% target, Kyoto budget

Source: Federal Environment Agency (UBA) 7 January 2014

# Renewable energy based electricity generation

RE electricity generation is the frontrunner amongst RE applications (dynamic increase over two decades)

### Development of electricity supply from renewable energy sources in Germany

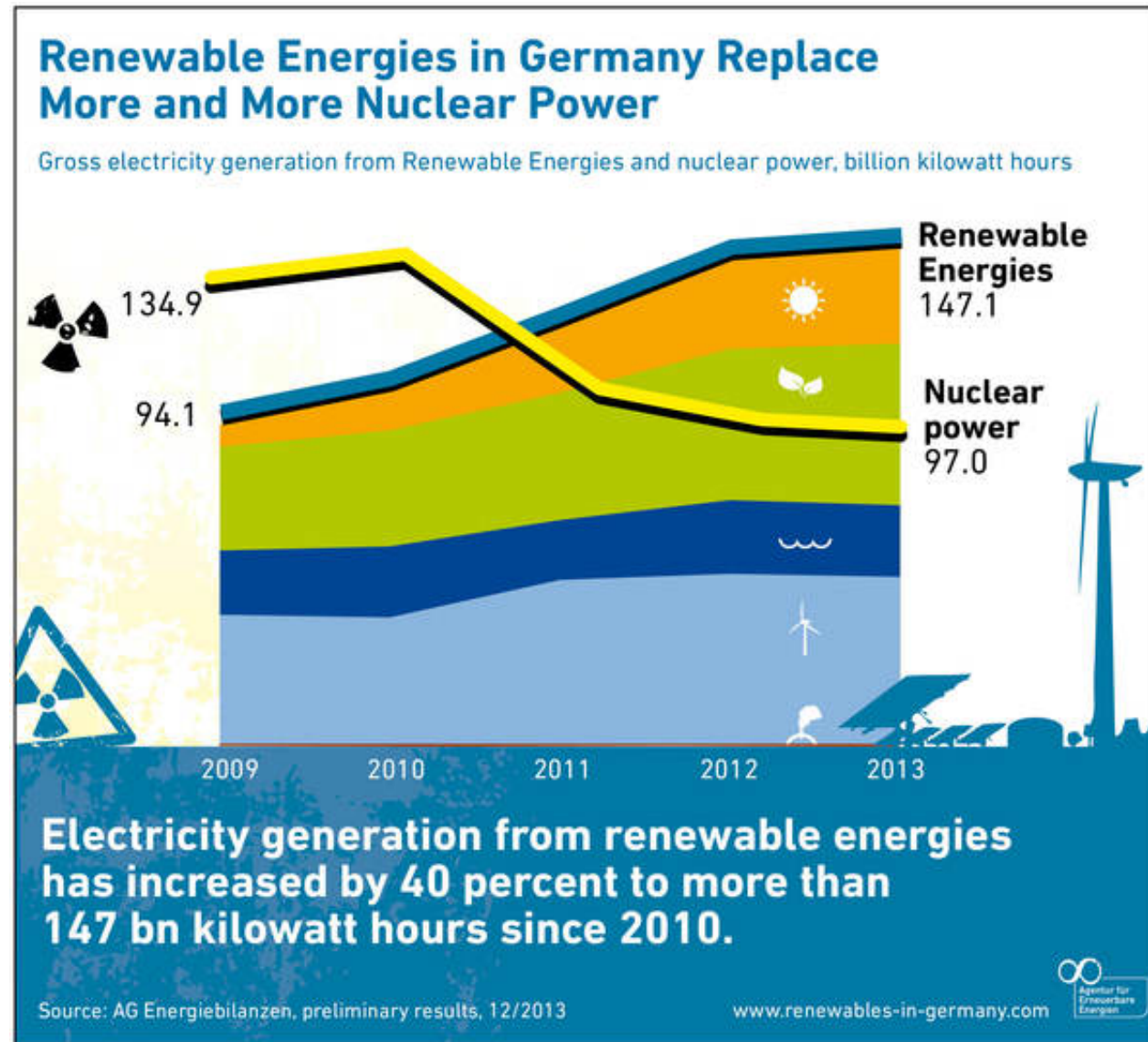


\* solid and liquid biomass, biogas, sewage gas, landfill gas and biogenic fraction of waste; ZSW according to Working Group on Renewable Energy-Statistics (AGEE-Stat); as at December 2013; all figures provisional

Source: BMU 2013

## Market deployment of renewable energies on track

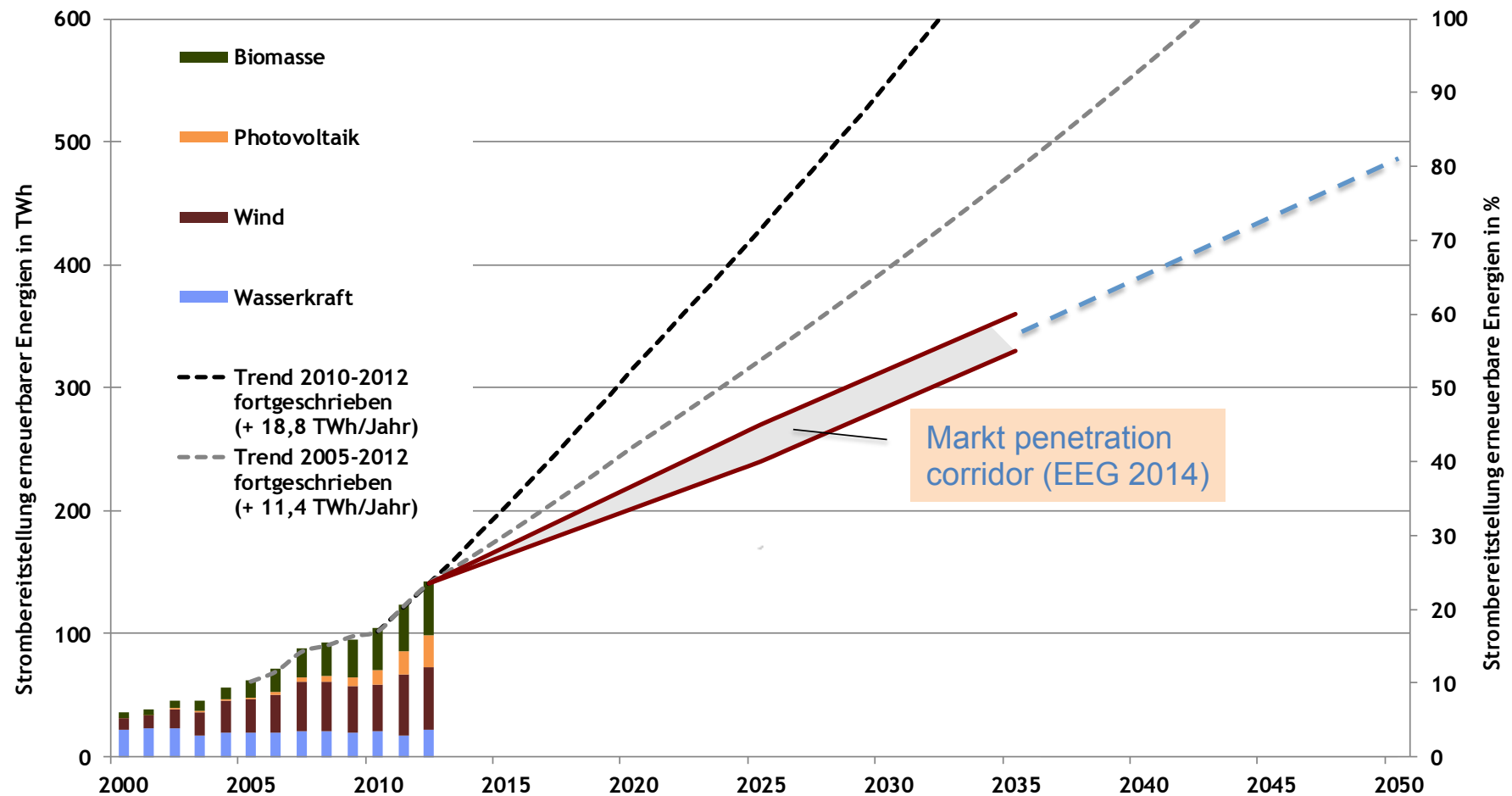
Renewable energy based electricity generation recently started to overshoot contribution of nuclear energy



Source: AEE 2013

# Amendment of Renewable Energy Law (EEG) will decrease market dynamic but makes realisation of long-term target still possible

## Determination of market penetration corridor

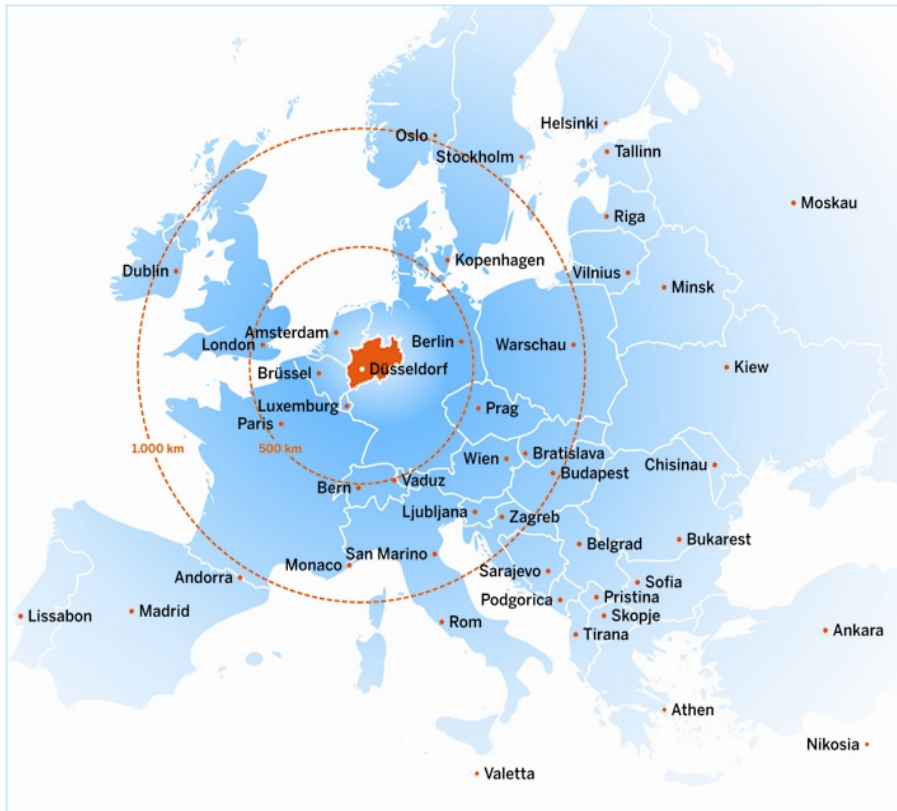


Source: FÖS 2014

# Key characteristics of the the German state North Rhine-Westphalia



## North Rhine-Westphalia – in the heart of Europe



- Germany  $\Rightarrow$  federal system
- North Rhine-Westphalia  $\Rightarrow$  one of a total of 16 German federal states
- With approx. 18 million inhabitants  $\Rightarrow$  the most populous state in Germany
- 34.000 square kilometres  $\Rightarrow$  the most densely populated state in Germany
- High industrial agglomeration, but also predominantly rural areas
- And: popular soccer teams!

## North Rhine-Westphalia – Energy State No. 1 in Germany

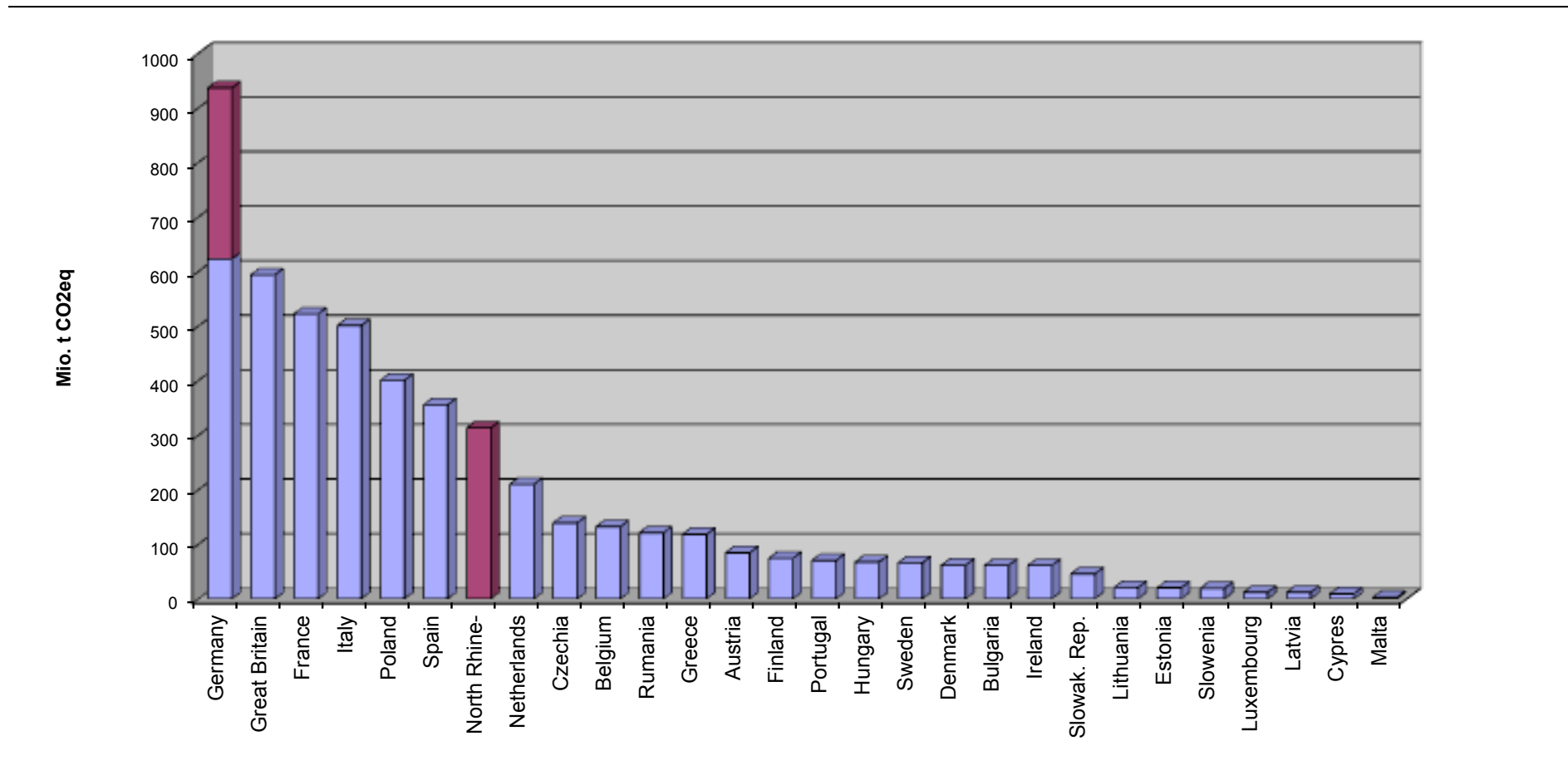
- 95% of German hard coal mining
- 53% of German lignite mining
- approx. 1.1 Mio. million employees in the energy sector
- approx. 30,000 MW of installed power plant capacity
- nearly 1/3 of the German electricity production → 70% coal-based, 90% fossil
- 35% of German CO<sub>2</sub>-emissions (~300 Mio. t/a)
- Per capita emissions: 16 t CO<sub>2</sub>/year



- **In order to reach the national and European mitigation targets North Rhine-Westphalia plays a crucial role**
- **If the industrial region of North Rhine-Westphalia does not succeed, it is unlikely that Germany and Europe will reach their targets**
- **Energy system transition in NRW can serve as blueprint for other industry intensive regions in the world**

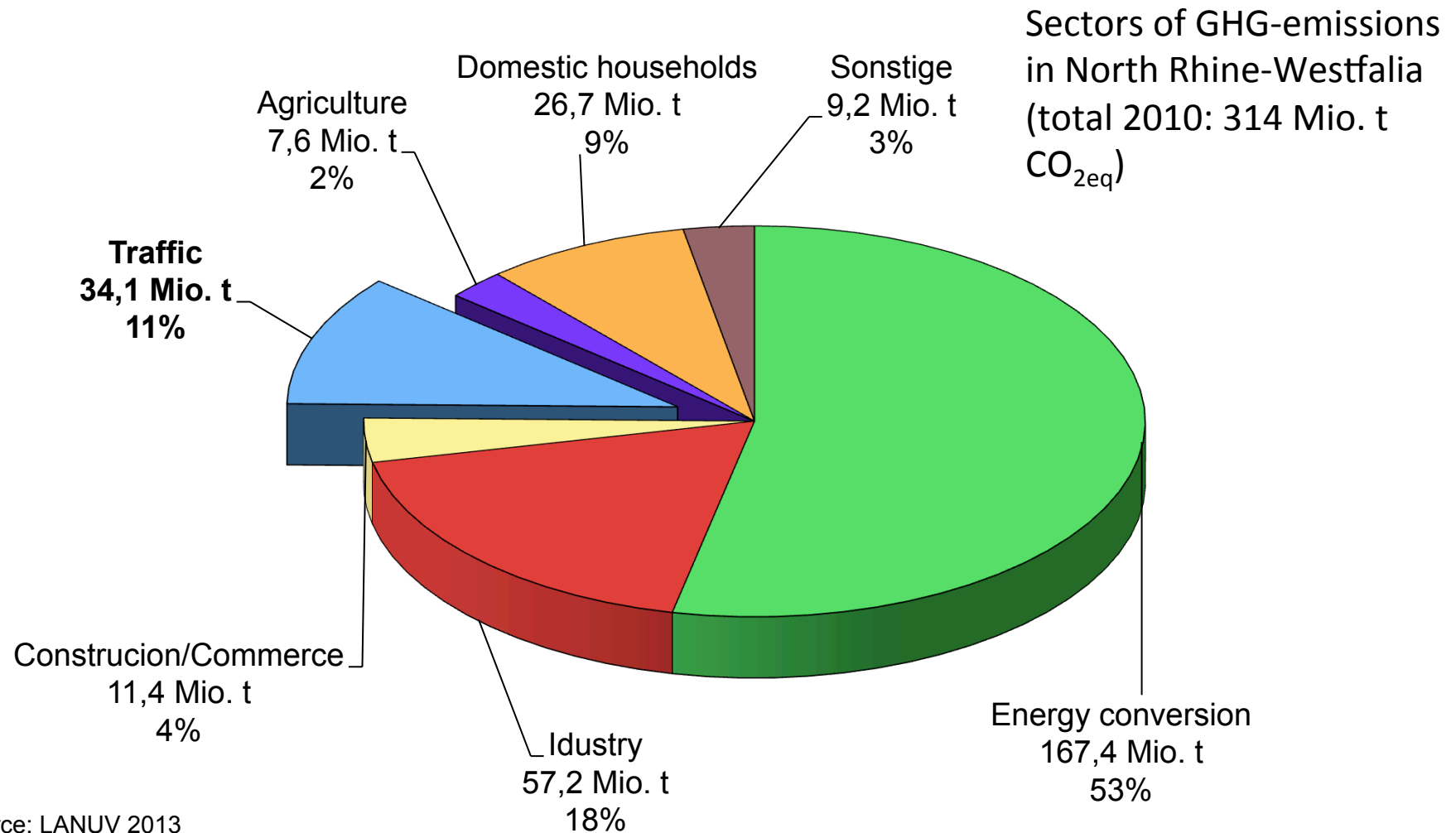
# North Rhine-Westphalia - central role for mitigation on a national level

## Total emissions of North Rhine-Westphalia NRW compared to other European countries (2010)



# North Rhine-Westphalias central role for mitigation on a national level

## GHG-Emissions disproportionally based on energy conversion



Source: LANUV 2013

## The role of the federal states on climate policy and the *energy turnaround* (“Energiewende”)

- Shaping an appropriate policy framework at the national and European level (especially through the Federal Council)
- Designation and authorisation of grid expansion
- Adaptation of spatial planning (planning rules for the expansion of renewable energy sources)
- State funding programs
- Use of information and consulting facilities (e.,g. NRW Energy Agency)
- Coordination and cooperation at the municipal level
- Refurbishment of own state estate
- etc.



# Legislative background in North Rhine-Westphalia - Climate Protection Act (since January 2013)

## Contents of the state level law

### – Goals of the Act

- ⇒ Greenhouse gas reduction in North Rhine-Westphalia:
  - at least 25% by 2020
  - at least 80% by 2050 (vs. 1990)
- ⇒ Expansion of renewable energies, increase the level of resource and energy efficiency, energy conservation
- ⇒ Limit negative impacts of climate change through adaptation measures

### – Implementation through the state government

- ⇒ Funding obligation
- ⇒ Obligation to educate, train and inform the public
- ⇒ Role model for achieving climate protection goals (in particular a carbon-neutral state administration)
- ⇒ Development of a **Climate Protection Plan** (within a participatory process)

## Key elements of the *Climate Protection Plan*

- Specification of central (technological, infrastructure and behavioural) strategies and needs to achieve the “Energiewende” goals at state level
- Identification of relevant system interdependencies and implementation barriers between relevant strategies
- Bundle **strategies** and **measures** in consistent scenarios/pathways showing how the climate protection goals outlined in the Climate Protection Act can be achieved
- Linking of mitigation and adaptation strategies and measures
- Specify the climate protection contribution: temporally, sectorally and regionally
- **Guarantee of full participation** of social stakeholders in a wide-scale dialogue and participation process
- Specification of necessary support for all stakeholder to realize GHG mitigation measures and to adapt to climate change

# Why there is a broad participatory approach for the development of the climate action plan?

## Why participation?

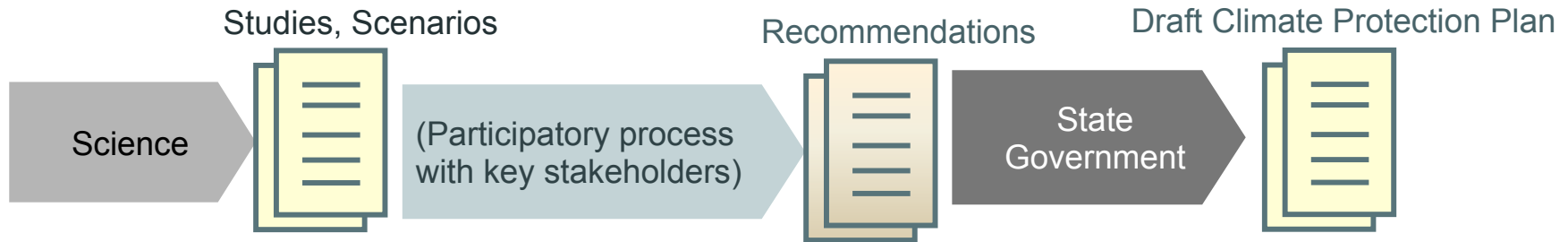
- Stick to legislative requirements
- Integration of experts know-how
- Maximum transparency
- Maximise acceptance and public engagement
- Create an appropriate implementation culture
- Stimulate new cooperation schemes
- Invitation for joint approaches



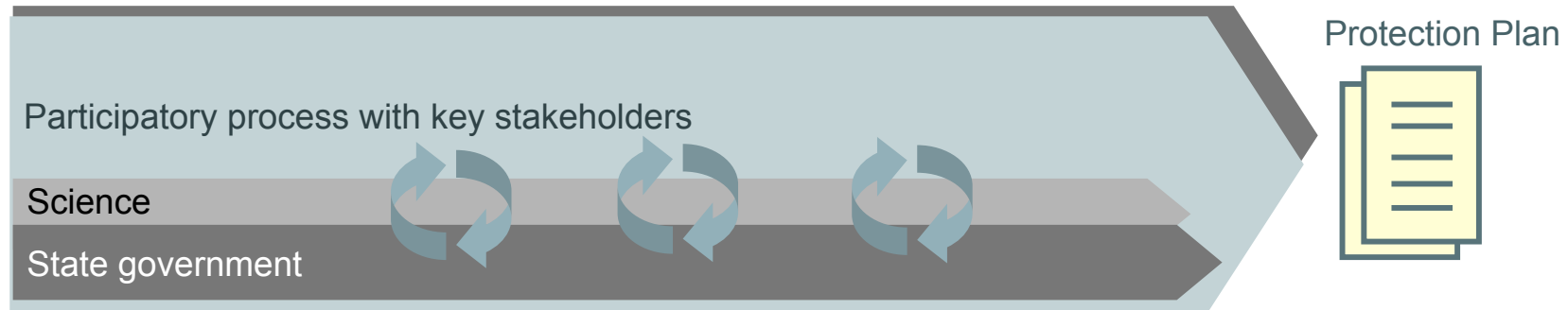


# General concept of the participatory process

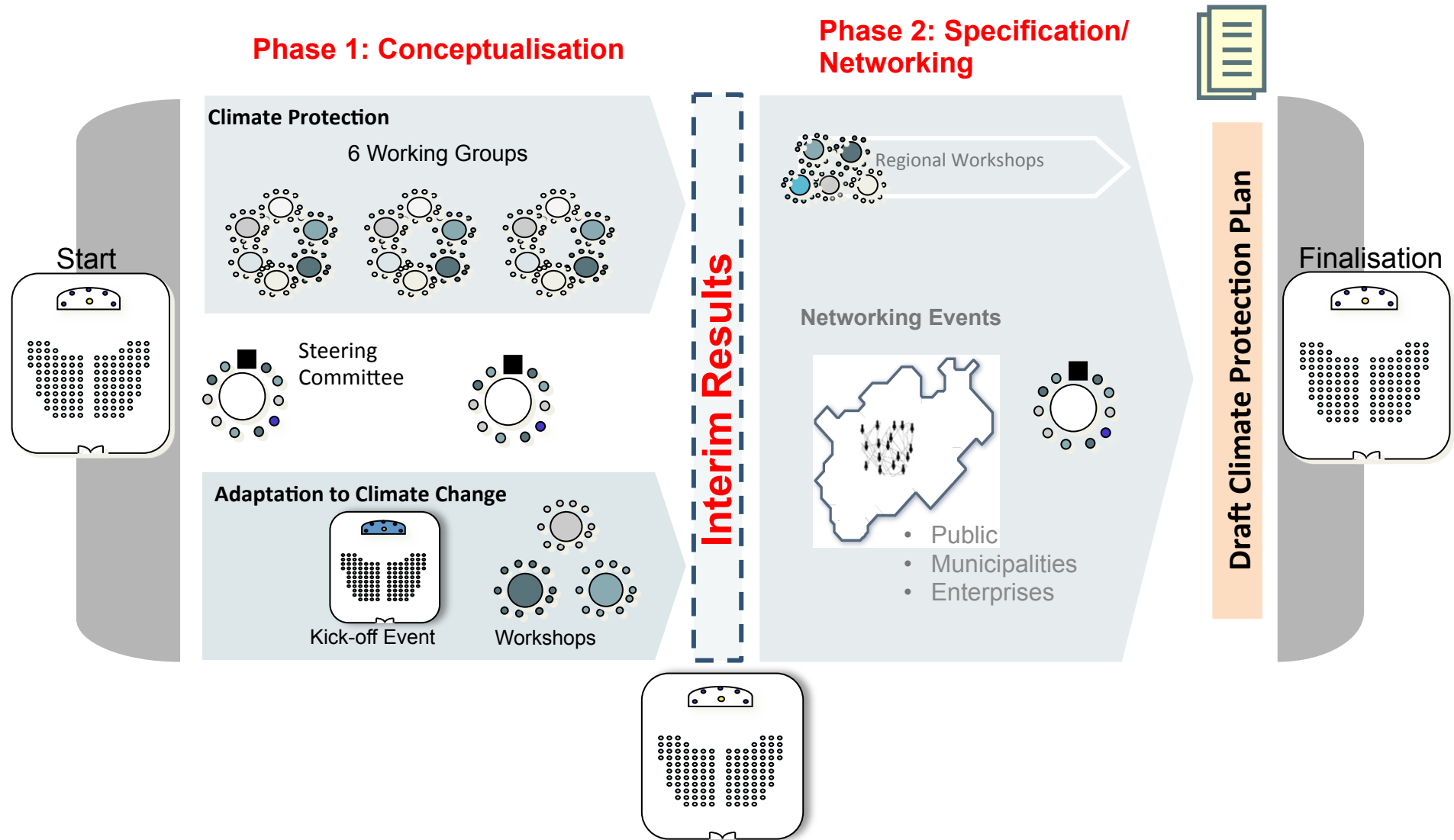
The process is NOT designed as a preparatory input to political decisions



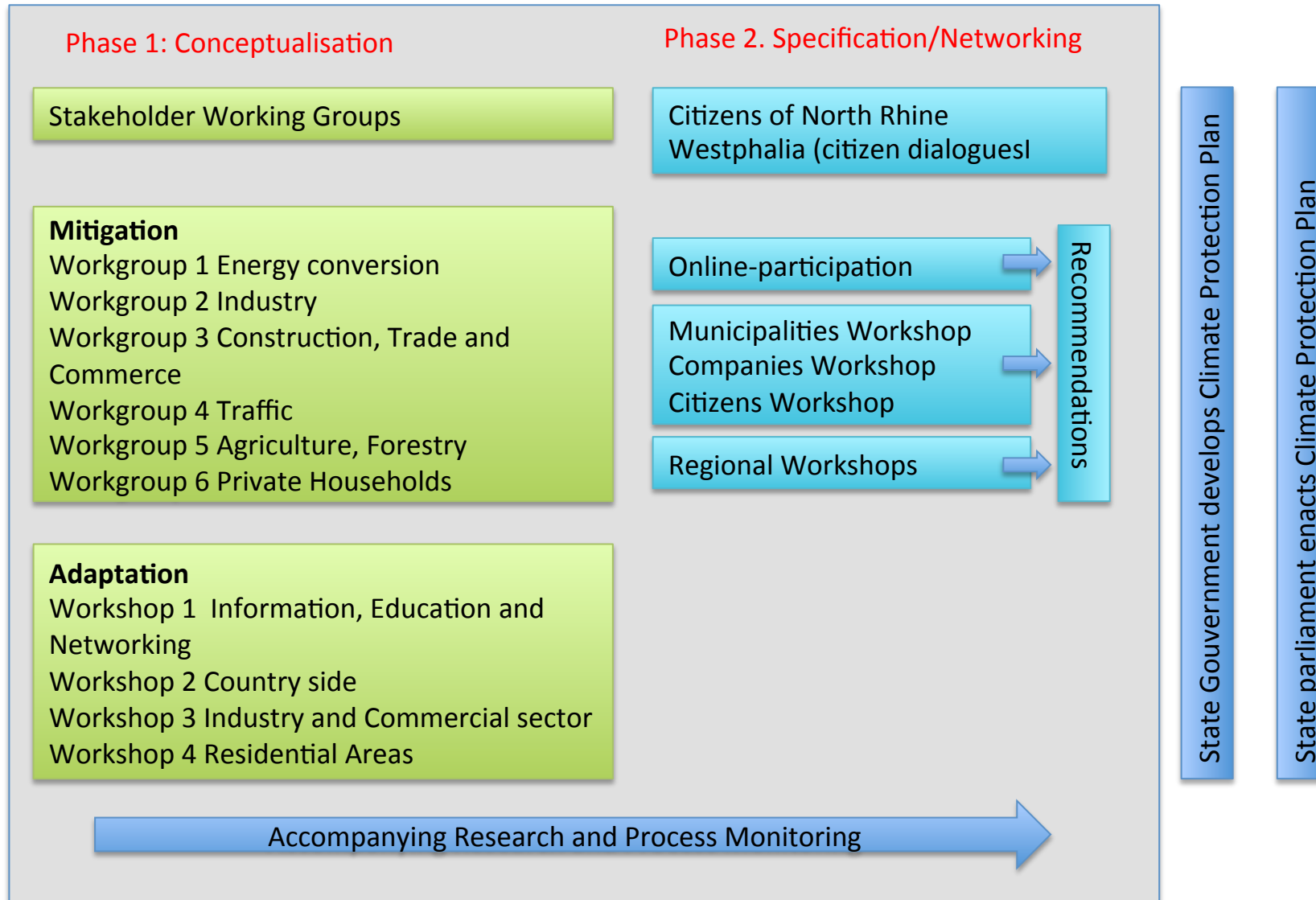
But: Iterative Process



# Structure of the participatory process



# Participation structure of the climate protection plan



## Conceptualisation phase - steps to develop stakeholder-based scenarios

	Steps	
1	Definition of strategies and topics	Working Groups
2	Discussion of possible developments of the strategies till 2050	Working Groups
3	Building a model of greenhouse gases emissions for NRW till 2050, based on stakeholder strategies	Wuppertal Institut
4	Presentation and diskussion of first scenario results	Working Groups
5	Scenario adjustment based on stakeholder comments	Wuppertal Institut
6	Presentation and diskussion of final scenario results	Working Groups
7	Impact Analysis of final scenarios	Prognos, Energynautics, GWS

## Scenario corridor tries to consider different stakeholder perspectives and deviating assessment

	Mitigation scenarios										Baseline	
Scenarios	A	A1	A2	B	B1	B2	BCCS	C	C1	C2	0,6	0,8
<b>Electricity production</b>												
Development renewables	low	high	high	high	100%*	low	high	low	100%*		very low	very low
Demand for electricity**	constant		constant				decreasing				constant	slightly decreasing
<b>Industry</b>												
Growth	1,2%		1,2%				0,6%				0,6%	1,2%
Technology	Best available technology		Low carbon technology				Low carbon technology				cost-efficient available technology	
Usage of H2 in PJ 2050	-		140		280	140	200		280		-	-
<b>Buildings</b>												
Reconstruction rate	1,4%	0,7%	1,4%	2,0%	1,4%	2,0%		2,0%			0,7%	
<b>Mitigation of GHG-Emission in NRW***</b>												
1990-2020 (Target -25%)	-21%	-20%	-25%	-26%	-26%	-27%	-22%	-29%	-24%	-29%	-21%	-16%
1990-2050 (Target -80%)	-57%	-57%	-60%	-65%	-64%	-79%	-67%	-69%	-68%	-82%	-51%	-40%

\* 100% of electricity production from renewables

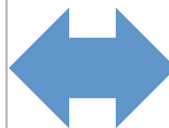
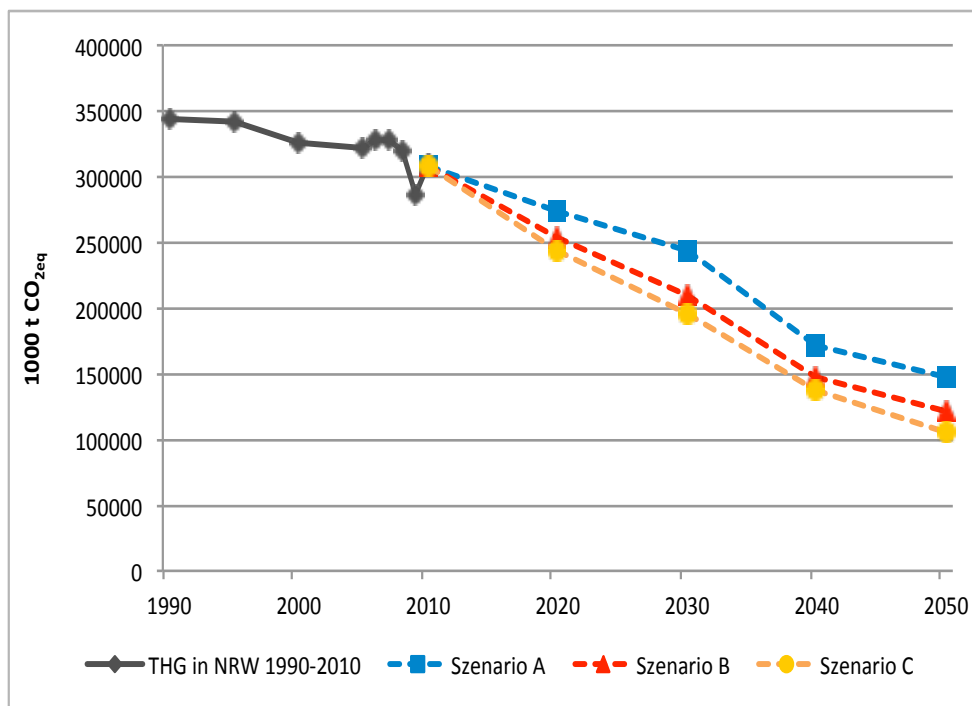
\*\* electricity demand are scenario results

\*\*\* domestic mitigation in North Rhine-Westfalia excluding emission trading

Source: Wuppertal Institute 2014, Prognos 2014

# GHG-Emissions (1000 t CO<sub>2</sub>eq) for core scenarios in North Rhine-Westphalia till 2050

(Scenarios A, B and C Climate Protection Plan participation process)

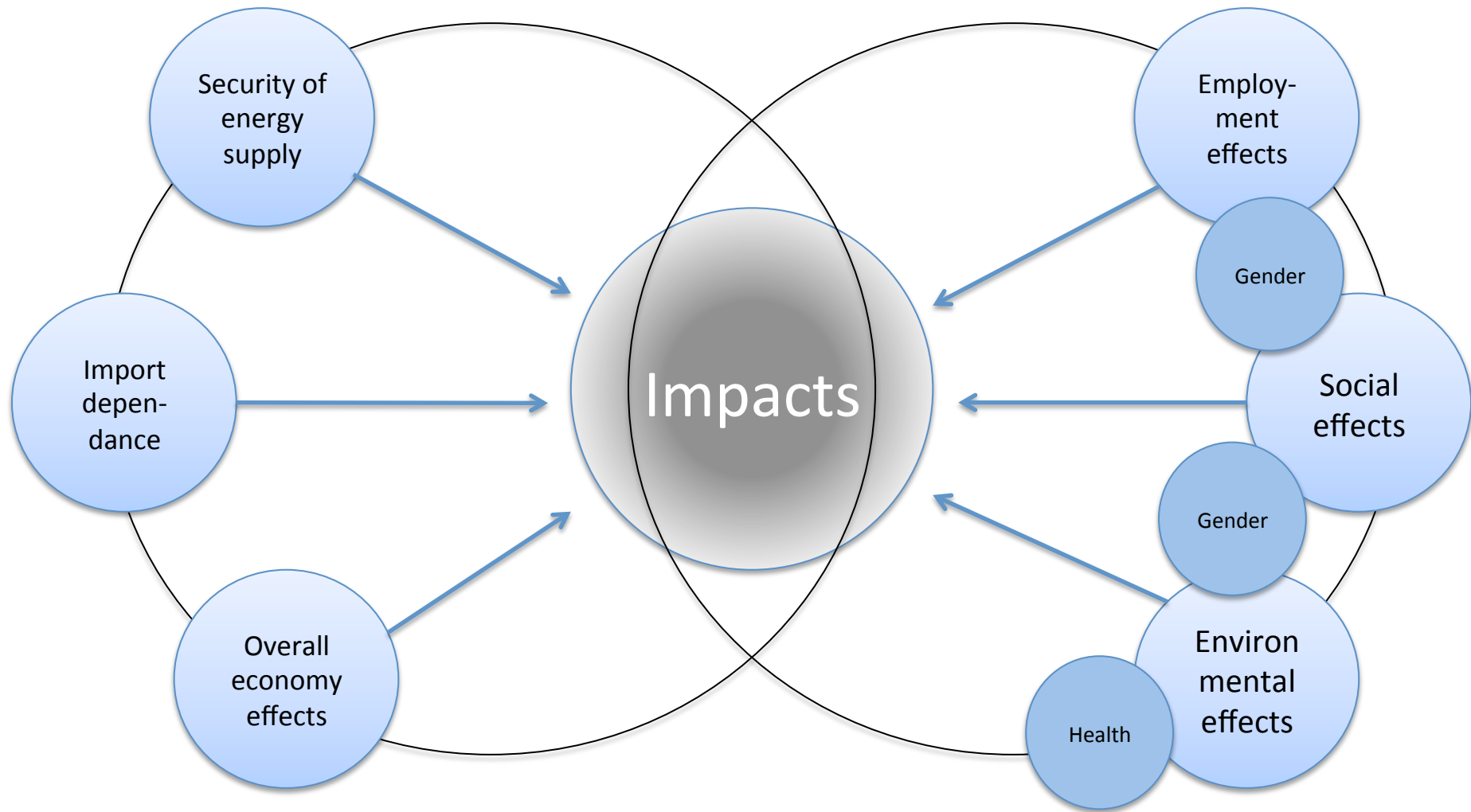


	Mitigation 1990/2020	Mitigation 1990/2050
<b>Scenario A</b>	-21%	-57%
<b>Scenario B</b>	-26%	-65%
<b>Scenario C</b>	-29%	-69%

	2010	2020	2030	2040	2050	Mitigation 1990/2020	Mitigation 1990/2050
<b>Scenario A</b>	786.833	710.462	587.709	444.128	316.086	-28%	-68%
<b>Scenario B</b>	786.833	662.715	520.089	389.640	274.705	-33%	-72%
<b>Scenario C</b>	786.833	666.251	506.020	378.352	260.786	-33%	-74%

**GHG mitigation on national level  
(corresponding scenario results for federal level)**

# Systematic multi-criteria impact assessment helps to view scenario results from different perspectives and come to a holistic assessment



Source: Prognos 2014

## Scenario interpretation and further options

- Only some of the scenarios (e.g. 100% renewable energy scenarios – electricity generation) can meet the GHG mitigation goals (physically) in NRW – most of them stay into a corridor between 60 and 70% GHG mitigation (2050 to 1990 level)
- However: The mitigation target could be achieved through the European emission trading system: prerequisite is a substantial tightening of the EU ETS goals

In addition:

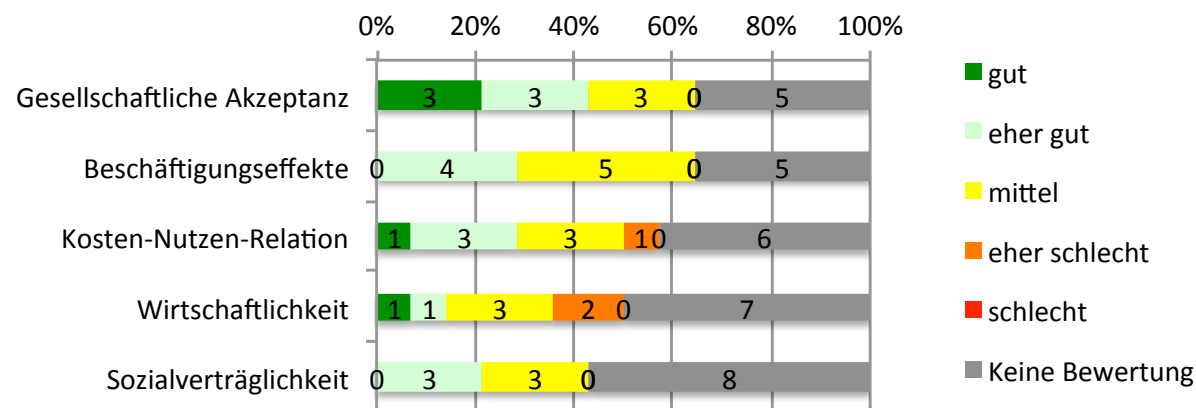
- Till 2050 further technology improvement are possible, scenario presumptions are moderate as yet
- There are a lot of mitigation measures which could not be quantified (and included) due to absent data and experience (like impacts of changing consumer behaviour)
- More ambitious components are thinkable like an early integration of renewable energy based methane or a radical shift of the modal split



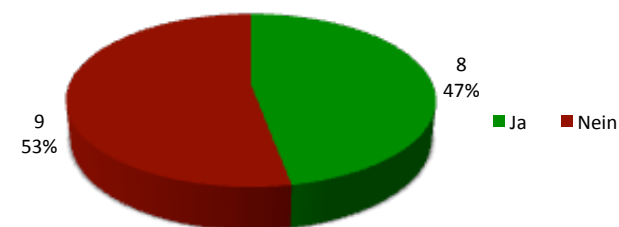
## Steps to develop and specify concrete mitigation measures (policy instruments)

	Steps
1	Definition of criteria to characterize mitigation measures
2	Collection and description of mitigation measures
3	Content verification
4	Online verification
5	Mitigation measure discussion and selection based on several criteria – group assessment of integration or not into the climate protection plan

## Assessment criteria for discussion of mitigation measures in the working groups and used in online survey

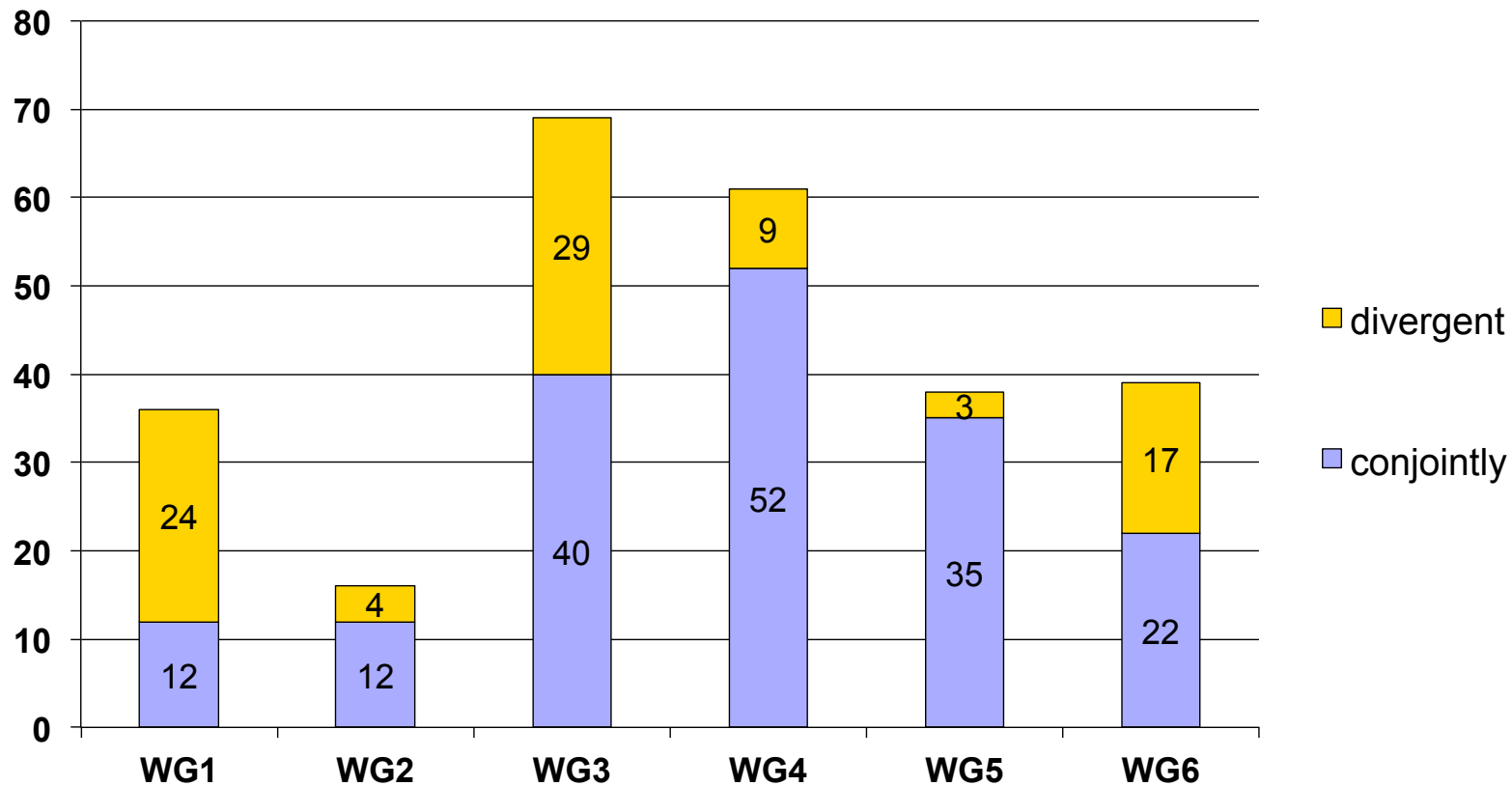


### Recommendation



- Additional transparent information about arguments in favor or against implementation (collection of Pro's and Con's)
- Mitigation measures were discussed and selected during a stakeholder meeting

## Summary concrete mitigation measures (policy instruments)



→ Total number: 258

→ Additionally measures from climate change adaptation: 103

## **Additional benefits through the participation process: Political benefits**

- Specification of stakeholder family relevant for the implementation and monitoring of ambitious climate protection policy in North Rhine-Westphalia
- Significantly improved knowledge base about mitigation potentials and scenarios in North Rhine-Westphalia (scenario corridor as orientation mark for assessment of options for action)
- Sound foundation for selection and implementation of mitigation measures (policy instruments)
- Lighthouse effect beyond North Rhine-Westphalia for similar participatory processes

## **Additional benefits through the participation process: Communication and participation benefits**

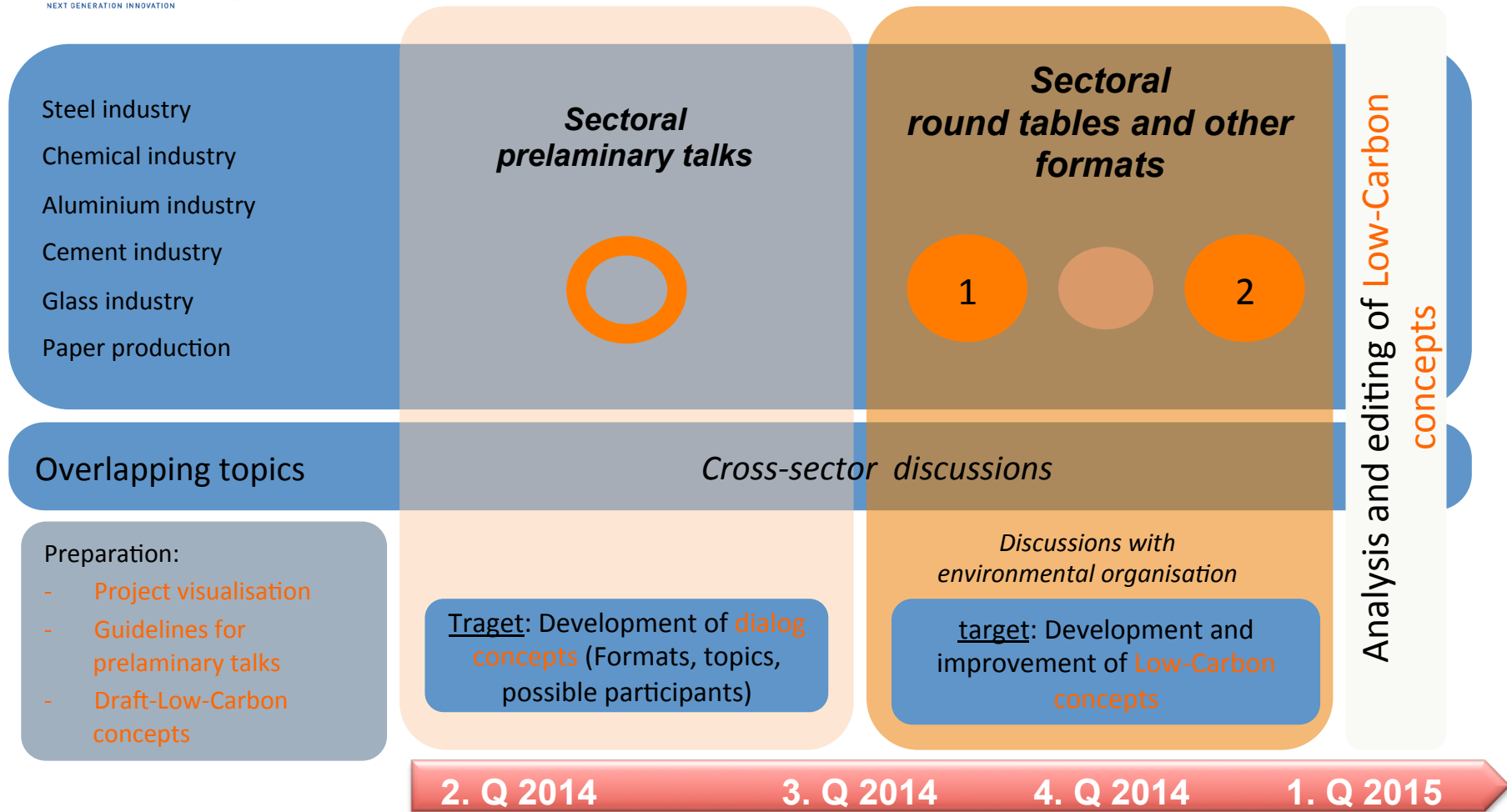
- Highly productive discussion culture buildup in the working groups
- Awareness rising for different perspectives throughout the stakeholders
- Confidence building between stakeholders and ministries, especially between industry and ministry for Environment
- Better chance to implement mitigation measures jointly developed with relevant stakeholders
- Starting point for further dialog structures with stakeholders (industry)

# Dialogue on climate protection with the industry in North Rhine-Westphalia based on the climate protection plan participation process



## 1.: Conceptualisation

## 2.: Implementation



Thank you very much for your attention!

